

**International Journal of Interdisciplinary and Multidisciplinary
Research (IJIMR)**

ISSN 2456-4567

**Formulation and Evaluation of Polyherbal Anti-Dandruff
Shampoo**

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Abstract

Polyherbal anti-dandruff shampoos are formulated using a blend of various herbs and natural ingredients to effectively treat dandruff and promote healthy hair. The *Malassezia furfur* fungus is a common cause of dandruff, which can be managed but not fully eliminated. These shampoos aim to clean the scalp, remove dandruff, and provide conditioning benefits without the use of harsh synthetic chemicals. Key herbs used in polyherbal anti-dandruff shampoos include curry leaves, fanugreek, flaxseed, rice water, brahmi, reetha, and aloe vera etc. These herbs possess antimicrobial, antioxidant, and hair growth promoting properties. The formulations are evaluated for various parameters such as pH, viscosity, dirt dispersion, foaming ability, foam stability, and antimicrobial activity against dandruff-causing fungi. Polyherbal anti-dandruff shampoos provide a natural, safe, and effective alternative to conventional shampoos. They cater to the growing demand for holistic hair care solutions that prioritize the use of plant-based ingredients over synthetic chemicals. These shampoos offer a comprehensive approach to treat dandruff while nourishing and conditioning the hair and scalp.

Keywords: Antidandruff shampoo, malazasia fufur, anti fungal activity, evaluation parameters.

INTRODUCTION

Herbal shampoos are a kind of cosmetic preparation made from natural plant elements such as herb(1). "Herbal shampoo" refers to any hair cleaning product that contains extracts of Ayurvedic herbs and flowers. It can also be described as a viscous liquid hair care solution intended to clean and remove oil and grime from hair(2). The shampoo's many benefits include lubrication, conditioning, hair development, decreased hair loss, color maintenance, and medicine. It also plays important functions as a keratolytic agent, has cleaning properties, and fights dandruff. The primary purpose of shampoo preparation is to remove debris and dandruff while also leaving hair feeling smooth and silky(3). Plants are made up of a variety of chemical components that perform a range of biological tasks that are essential for disease resistance or the treatment of several illnesses. The skin problem known as dandruff is brought on by the *Malassezia* fungus, which irritates and coats the scalp (4). A common scalp condition that affects about half of the population is dandruff. When dandruff forms, keratinocytes are crucial for the expression and production of immune responses (5). Wintertime makes dandruff more severe. Dandruff was treated with a variety of specialty shampoos, including herbal and synthetic formulations. The current work aims to prevent the use of commercially available synthetic or chemical preparations. A number of herbal substances that are anti-dandruff and encourage hair growth were utilized (6). These ingredients also leave hair

1	Curry leaves	Murruya koenigii	Rutaceae	Fresh leaves	Antifungal/ anti bacterial agent
2	flaxseed	Linum usitatissimum	Linaceae	seeds	Antidandruff and moisturizing agent
3	fanugreek	Trigonella foenum-graecum	Fabaceae	seeds	Restore shine
4	Rice water	Oryza Sativa	Gramineae (poceae)	grain	Prevent dryness in hair
5	Aloe vera	Aloe barbadensis miller	sapindaceae	Latex of leaves	Soothing agent
6	reetha	Sapindus Mukorossi	Sapindaceae	seeds	Foaming and antidandruff agent
7	brahmi	Bacopa Monnieri	Scrophlariaceae	root	Hair tonic
8	Lemon juice	Citrus limon burm	Rutaceae	Fresh ripe fruit juice	Preservative, antifungal agent

Table No.1 herbs used in formulation

feeling soft and shiny. Most importantly, these preparations don't cost a lot of money (7). The composition contains a variety of plants, including curry leaves, flaxseed, fanugreek, reetha, rice water and brahmi.

MATERIAL AND METHODS

Collection method

All the medicinal plants were collected for Herbal antidandruff shampoo stud namely as curry leaves , Flaxseeds, fanugreek, reetha ,rice water and Brahmi, The plant specimen was collected from Local market.

EXTRACTION PROCESS

Curry leaves Extraction

20Grams of curry leaves was taken for its extract preparatio using Soxhlet extraction method .. The curry leaves had been packed in the filter paper and kept in the thimble part of the extractor. Solvent water, was chosen for extraction and 200ml of the solvent was taken in the round bottom flask. The heating mantle, round bottom flask, Soxhlet apparatus and condenser were connected to the running tap water and was assembled for the further extraction. The heat from the heating mantle rose up to the Soxhlet apparatus in form of vapor wherein, after condensation, droplets of the solvent dripped down from the Soxhlet apparatus where the sample had been kept for extraction from the sample. The siphon tube of apparatus was then filled with the extract which further dripped down to the round bottom flask. This process was repeated again and again(4-5) cycle until all the necessary materials were extracted from the curry leaves of aqueous solvent in the round bottom flask. The extract accumulated in the round bottom flask was brought to normal room temperature and were then filtered using Whatman filter paper number-1 and then store for formulation of shampoo.(8)



FigureNo.1Extraction process of curry leaves

Flaxseed Extraction

20 gm of Flaxseeds were weight accurately.200 ml water addedd into it. .And soaked over night and boiled in the same water used for soaking on medium flame, then allow it to cool and filter.



FigureNo.2 Extraction process of Flaxseed

Brahmi Extraction

25 gm of brahmi powder was taken in a beaker with 200 ml distilled water. Heat the mixture until it starts boiling. Cool the solution and then use the filtered decoction for preparation.



FigureNo.3 Extraction process of brahmi

Fanugreek Extraction:

20 gm of Fanugreek seed were weight accurately. 200ml water added into it.. And soaked over night and boiled in the FigureNo.9 Consistency of shampoo water used for soaking on medium flame, then allow it to cool and filter



FigureNo.4 Extractio process of Fanugreek seed

Reetha extraction:

25gm of Reetha fruits were weighed accurately. To the Reetha fruits 50ml of water was added, mixed well and soaked overnight and Then the solution was filtered and collected.



FigureNo. 5 Extraction process of reetha

Aloe Vera Extraction

Wash the aloe vera leaf. Cut or open the aloe vera leaf and remove the gel like pulp inside. Add the pulp to a blender and mix for at least one minute.



Figure No.6 extraction process of aloe vera

Rice water Extraction:

Take a cup of rice in a clean bowl and rinse with water once to remove dirt and impurities. Drain the water and add some amount of water to the rice, cover the bowl with a heavy lid. Keep the bowl aside at room temperature for a day. Later, collect the rice water and transfer it into a clean glass jar and allow it to ferment for 2 to 3 days. (9)

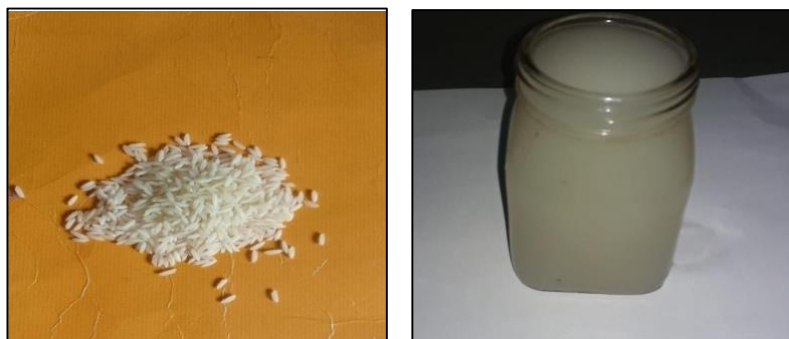


Figure No.7 extraction process of rice water

Authentication of herbs

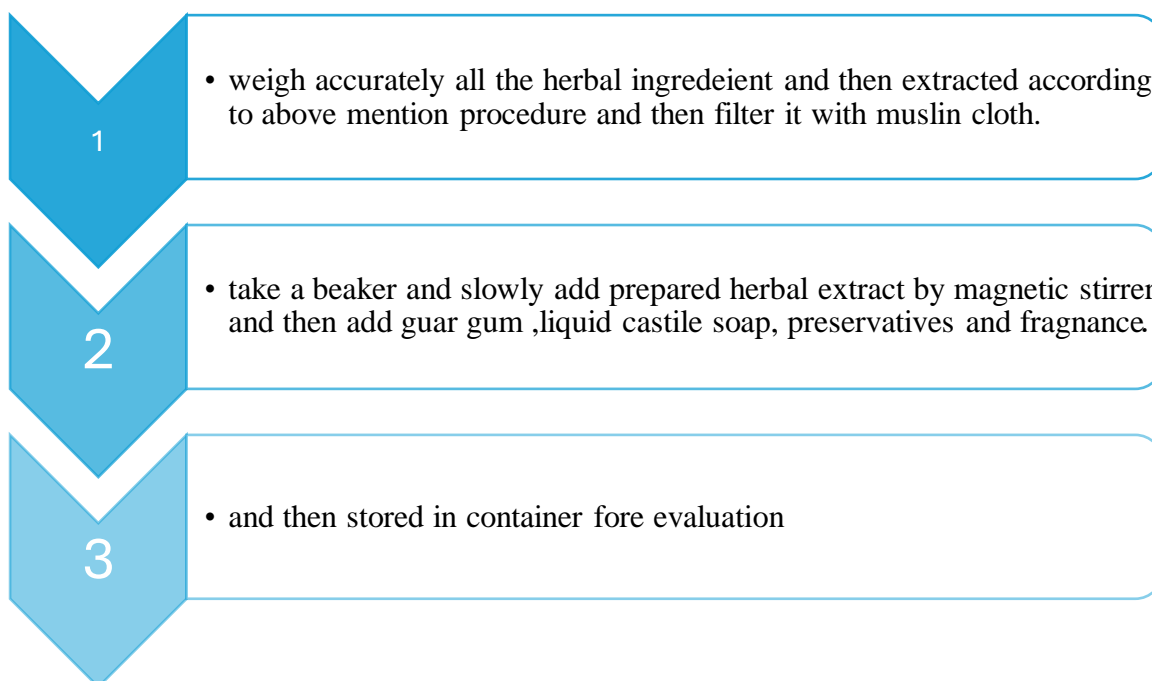
The authentication of required natural collected herbs was done from the Head of Department of Botany, Dayanand College of Arts and Science, Solapur.

Formulation of polyherbal Anti dandruff shampoo

Ingred ients	F1	F2	F3	F4
Curry leaves	15ml	10ml	8ml	8ml
Flaxseed	5ml	3ml	5ml	4ml
Fanugreek	3ml	4ml	3ml	3ml
Rice water	3ml	3ml	3ml	2ml
Aloe Vera	4ml	5ml	4ml	3ml
Reetha	5ml	3ml	6ml	8ml
Brahmi	2ml	3ml	4ml	3ml
Guar gum	0.18g m	0.36gm	0.5gm	0.5gm
Lemon juice	1ml	1ml	1ml	1ml
Castile soap	q.s	q.s	q.s	q.s
Water	q.s	q.s	q.s	q.s

Table2 :Formulations of polyherbal anti dandruff shampoo

METHOD OF PREPERATION



EVALUATION PARAMETER

Physical appearance

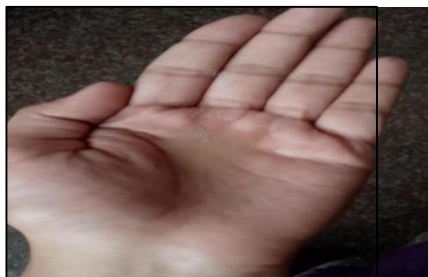
The formulated shampoo was evaluated for its consistency, colour, clarity, and visual appearance.



Figure No.8 physical appearance

Consistency

Shampoo formulation consistency was assessed by hand. Apply a small amount of shampoo with your fingertip.



FigureNo.9 Consistency of shampoo

Determination of pH

Using pH paper at room temperature, 1 milliliter of produced shampoo was diluted with 10 milliliters of distilled water to determine the shampoo's pH. (10)

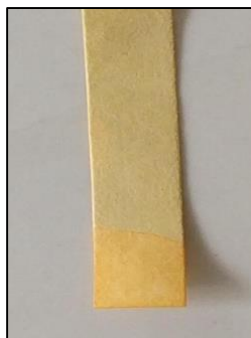


Figure No.10 pH determination

Determination of viscosity

Ostwald's viscometer was used to measure the prepared shampoo's viscosity at room temperature. Using the equation, the viscosity of the prepared shampoo was determined.(16)



FigureNo.11Determination of viscosity

Determination of percentage solid content

A dry and clean evaporating dish was weighed and then filled with 4 grams of shampoo. Up until the liquid part evaporated, the shampoo-containing evaporating dish was set on the hot plate. After the shampoo had dried, the weight of its solid components was determined.(11)
It was determined by using the formula.

$$\% \text{ of solid content} = \frac{C - A}{B} \times 100$$

Where;

A = weight of empty evaporating dish

B = weight of evaporating dish with shampoo solution

C = weight of evaporating dish after evaporation of shampoo solution.



Figure No.12 Determination of percentage solid content

Foam formation/Foam stability

The cylinder shake technique was applied. 50 ml of a 1% shampoo solution are added to a graduated

cylinder (1 ml in 100 ml of water), shake for ten minutes, and then note the amount of foam that forms after one minute. Note the foam's stability after four to five minutes.(12,13)



Figure No.13 Faom formation

Wetting time

A cotton ball weighing of about 0.44gm was taken and added it to container containing shampoo. Time taken for cotton to sink at bottom of the formulation was measured as wetting time .(14)

Dirt dispersion

One drop of ink and two drops of shampoo were introduced to a test tube filled with ten milliliters of water.Ten times,shake the test tube. Shampoo dispersion is shown by the estimated levels of ink foam, which are None, Light, Moderate, or Heavy.(15)



FigureNo.14 Dirt dispersion

Anti fungal activity

The method of diffusion assay was applied. Using an agar well diffusion assay method ,the anti microbial efficacy of polyherbal anti-dandruff shampoo was investigated against. *Candida* species . A 500 μ l suspension off ungal cells was applied to the Sabouraud Dextrose Agar(SDA) plate sand wells.A sterile stainless steel cork borer was used to create an 8mm diameter hole in the agar plates.20 μ l of the corresponding shampoo were added to the well.After 48hour sof incubation at 35°C \pm 2,the plates were check edto see if any inhibition zone shad formed around the wells.The diameter sof the inhibition zones were measured from the images using digital antibiotic zone reader.(16,17,18)



FigureNo.15 Antifungal activity

Stability Study

The stability of the formulation was studied for a period of four weeks by keeping at temperature of 25-30°C

RESULTS AND DISCUSSION

Parameters	F1	F2	F3	F4
Colour	Lightbrown	Lightbrown	Lightbrown	Lightbrown
Odour	characteristic	characteristic	characteristic	charecterstic
Clarity	Non-transparent	Non-transparent	Non-transparent	Non-transparent
Appearance	Viscousin nature	Viscousin nature	Viscousin nature	Viscousin nature
Consistency	smooth	smooth	smooth	smooth
pH	5.81	5.91	6.4	6.24
Viscosity	1.13	1.18	1.23	1.15
%Solid Content	20.53	22.11	24.44	21.58
Foam Formulation	Foam disappear after sometime	Foam disappear after sometime	Stablefoam	Stablefoam
Wetting Time	120 sec	135 sec	140 sec	145 sec
DirtDispersion	Moderate	Moderate	Light	Light

Table3 .Evaluation parameters for Antidandruff Shampoo

Physical Appearance:

The formulated and marketed shampoos were evaluated for physical characteristics such as color, odor and transparency. Our prepared shampoo was non transparent, light brown and had characteristic odor..(table 3)

Consistency:

The consistency of shampoo was observed smooth..

pH determination:

The pH balance of the product is important as it affects skin and surface on which thereally areused.The pH of our formulated shampoo falls with the ideal pH range of the shampoo.(Table 3)

Viscosity:

The viscosity was intherange1.10 to1.30 poise which gives great fluidity,which makes formulation east to apply on and easy to spread on hair.

% solid content:

Good shampoos usually have 20%–30% solid content as it is easy to be applied and rinse out from the hair. If it doesn't have enough solid it will be too wateryand wash away quickly,similarly too many solids will be hard to work in to the hair or too hard to wash out. The percent solid contents of all the tested shampoo was found within the range of 20%–25% and are expected to wash out easily (Table 3).

Foam Formulation :

One of the essential parameters in evaluating a shampoo is lathering or mostly described as foaming.The formulated herbal shampoo resulted in the formation of small-medium, dense and uniform type of foam. The foam volume remained unchanged during a 5-minute period which suggests that the produced foams have good stability. The results were shown in (Table 3).

Wetting Time:

The wetting ability of a surfactant is dependent on its concentration and is commonly used to testits efficacy. The canvas disc method is quick, efficient and reliable test to evaluatethe wetting ability of a shampoo.The wetting time of the four shampoo was found in the order 120 sec, 135 sec, 140 sec , 145 sec. The results were shown in (Table 3).

Dirt Dispersion:

Dirt dispersion is an important criterion for evaluation of cleansing action of shampoo. Shampoos that cause the ink to concentrate in the foam are considered of poor quality because ink or dirt that stays in foam is difficult to rinse away and gets re-deposited on the hair cleansing action.All shampoo concentrated the-ink in the water portion,ensuring their satisfactory cleaning ability and actual

effectiveness. The results were shown in table (3)

Antifungal activity

The formulated shampoo shows anti-fungal activity against candida sp. Fungi

Sr.No	Name of the microorganism	Diameter of zone of inhibition(mm)shampoo
1	Candida sp.	27mm

Tableno.4 Anti fungal activity

CONCLUSION

- ❖ We have used curry leaves,Flaxseeds,fanugreek and other plant extracts to provide anti-dandruff and conditioning properties in place of cationic conditioner.
- ❖ Preventing dandruff and its associated illnesses was the primary goal of the formulation of the polyherbal anti-dandruff shampoo.
- ❖ Incomparison to synthetic shampoo,it was shown that herbal anti-dandruff shampoo made from natural ingredients had fewer negative effects.
- ❖ Our shampoo's evaluation study revealed strong foaming ability, fast wetting time, and good dirt dispersion.
- ❖ We have done the Antifungal testing which Confirmed that the herbal anti dandruff shampoo reduces dandruff and infection.

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